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very rare plant in many sections of the country where formerly it was common.

The list of wild flowers which have suffered most severely from the overzealous admirers is a long one, but space need be taken to mention only a few of the most important. They are the showy lady's-slipper, the moccasin flower, the rose pogonia, the arethusa, mertensia or blue bells, white water lily, American lotus, and the anemone or wind flower. To this list I am sure almost any lover of wild flowers could make many additions.

Education looking toward the right estimation and preservation of our diminishing forms of wild life ought to be more generally and widely extended, but even at its best probably would not reach many classes of people who are the worst offenders. Meanwhile it seems most desirable that we should use all our efforts in the establishment of national, state and private wild-life reserves, of both large and small size, in all sections of the land, where not alone shall the animal and bird life find safety and refuge but where also the native plant life shall be equally protected.

THE RECEPTACLE OF ACHILLEA MILLEFOLIUM L.

By Mabel L. Merriman

The receptacle of the genus *Achillea* is given as flat or convex in Britton's manual of North American flora. Similarly in Gray's new manual the character of the receptacle is expressed by the word "flattish."

Clusters of *Achillea millefolium* L. brought in for class study in Oct., 1919, exhibited heads either markedly conical or oblong in shape in contrast to the usual flat-topped or slightly convex forms. It was thought at first that the difference in appearance might be due to a lengthening of the tubular flowers in the center of the head. A lengthwise section of the head showed that the receptacle had become much elongated, being narrowed to nearly the width of the stem axis, the section suggesting in its contour

spicate inflorescence. The presence of buds at the apex of the section signifies that such elongation must have preceded flower formation and hence have been an early growth of the meristematic tissue; an evidence of a change in organization rather than an adaptive variation.

The interest awakened by these specimens stimulated further collections in other localities in the fall months of 1920. Plants with conical and oblong heads were collected at various points in Highlands, N. J. These plants were growing in gravelly soil on hillsides at some distance from the beach.

Fig. 1 was drawn to scale from a lengthwise section of a normal head with a flat receptacle. The projection of tubular flowers beyond the marginal ray flowers is less than one mm. in the flat receptacled forms. The external view of a head shown in Fig. 2 and the lengthwise section in Fig. 3 are of an example on another branch of the same plant where the prolongation of the head beyond the involucre was 4 mm. There were from 23 to 27 flowers in these heads while those with the flat receptacles averaged 12 flowers in a head. In all examined it was found that the elongation of the receptacle resulted in an increase of perfect flowers and hence of fruits. It has been shown by various investigators as reviewed by Stout and Boas* in their statistical studies of *Cichorium* that number of flowers per head varies with the position in the inflorescence. With *Achillea* it would appear that the form of the receptacle is a governing factor.

Two weeks later when on a collecting trip in the Edenwald section of the Bronx plants were found possessing receptacles with a much greater elongation. Figs. 4 and 5 are of one from this locality. Expressing the measurements in order of proximity of heads in a corymb, the elongation of the receptacles are as follows in mm.: 7, 7, 7, 6, 6, 8, another 8, 9, 11, 11, 10, 11, 10, 10, 7, 9, in another 10, 9, 10, 10, 11, 11, with six succeeding of 10 mm. Another branch had corymbs with 4 adjoining heads of 10 mm., 7 of 9 mm., with the remaining ones of 8, 8, 9, 9, 8 mm. It is to

* Stout, A. B., and Helene M. Boas, Statistical Studies of Flower Number per Head in *Cichorium intybus* N.—Kinds of Variability, Heredity and Effects of Selection, Mem. Torrey Bot. Club: 17, 334–458, 1918.

be noted that these specimens show not only heads of greater elongation than those previously found but that on the corymbs there are no heads showing intermediate stages and in all the

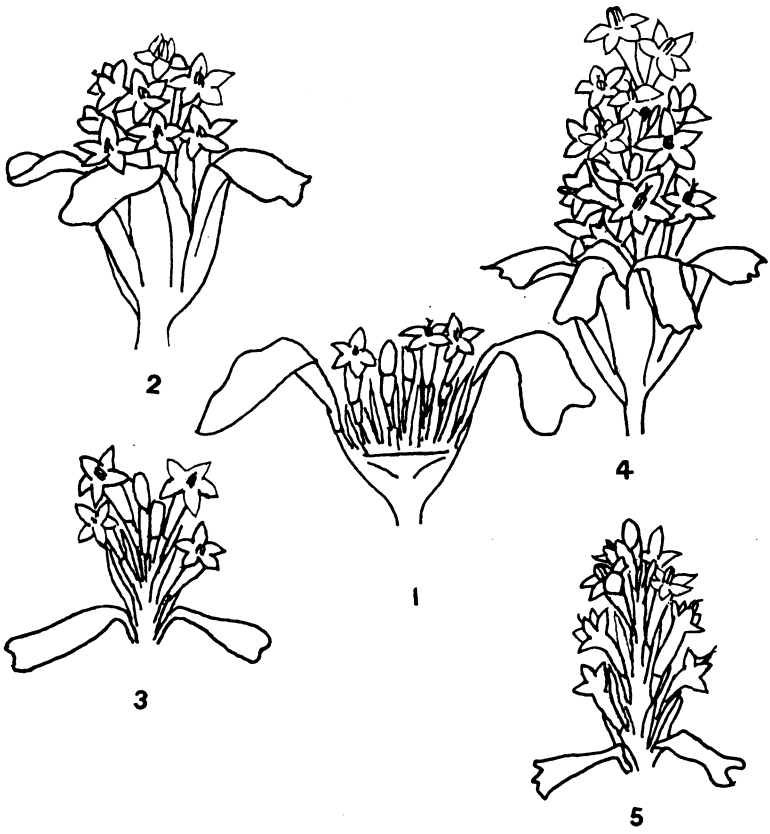

FIG. 1. A lengthwise section of a common form of yarrow with flat-topped receptacle. × 5.

FIGS. 2 AND 3. External view and lengthwise section of a head with an elongated receptacle measuring 4 mm. × 5.

FIGS. 4 AND 5. External view and lengthwise section of a head with an elongated receptacle measuring 7 mm. × 5.

heads there is a tendency in nearby receptacles to show a similar measurement. Another plant with heads similar to that shown in Fig. 4 had ray flowers interspersed with the tubular flowers on the elongated receptacle. These were in addition to the usual number surrounding the head.

The depth of the involucre remained constant for all the forms collected.

The notes here presented are but inadequate observations. They suggest the desirability of conducting genetical studies in this genus which as in the case of the mutating oenotheras consist of forms growing far from their place of origin.

Extensive experiments might solve the problem as to whether in these elongated receptacles we have mutating characters or reversions. The resulting spike-like cluster characteristic of more primitive plants might indicate the latter interpretations as the more probable. Jost states on page 395 of his work on Plant Physiologie:† "New characters, that is mutations, behave the same as reversions."

It is in the genus *Achillea* that we also have the oft-quoted examples of species mutually excluding each other from calcareous and siliciferous soils. Schimper states in Plant Geography,‡ page 105, that *Achillea millefolium* will grow equally well in either kind of soil while *A. moschata* is an inhabitant of siliciferous soil, excluding *A. atrata* which prefers calcareous soils. It would be of interest to determine the lengths of the receptacles of the plants growing in these different kinds of soils and the influence if any of change of soil in modifying the lengths of the receptacle. It is possible also that seasonal conditions may be important factors in the appearance of these interesting plants.

HUNTER COLLEGE,
NEW YORK CITY

ADDITIONS TO THE FLORA OF WESTERN OREGON DURING 1920

BY JAMES C. NELSON

Although the writer did not find it possible to collect very extensively during the past season, the introduction of foreign plants into Western Oregon seems to have gone on unchecked.

† Jost, Ludwig, Lectures on Plant Physiology, 1907, trans. by Gibson.

‡ Schimper, A. F. W., Plant Geography upon a Physiological Basis, 1903, trans. by Fisher.